Having thus described the preferred embodiments, the invention is now claimed to be:

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1. A method of diagnostic imaging comprising:

collecting a plurality of projection data sets at each of a plurality of angles around a subject, the projection images being collected over less than 360°;

performing a resolution recovery process on the projection data sets; and

reconstructing the resolution recovered projection data sets into an image representation.

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2. The method as set forth in claim 1 wherein the projection data sets span less than 360°.

3. The method as set forth in claim 1 wherein the projection data sets are collected spanning 204°.

4. The method as set forth in claim 1 wherein the resolution recovery step is performed in at least an angular rotation dimension, the resolution recovery step including:

zero-filling projection image data sets in the angular rotation direction, such that the zero-filled and actually collected projection data sets together span 360° at regular angular increments.

5. The method as set forth in claim 4, further including:

smoothing an interface between the actually collected and zero-filled data sets.

6. The method as set forth in claim 5 further including:

transforming the smoothed data sets into frequency space;

stationarily deconvolving the frequency space data sets with a resolution recovery filter function; and

transforming the stationarily deconvolved data sets from frequency space to image space.

7. The method as set forth in claim 6 further including:

rotating detector heads continuously around the subject;

binning projection data collected over preselected angular increments into the projection data sets; and

in the deconvolving step, deconvolving the frequency space data sets with:

$$\frac{\sin(n\Delta\phi/2)}{n\Delta\phi/2}\hat{g}\left(\omega_s,\omega_z,\frac{n}{\omega_s}\right)$$

where $\Delta\phi$ is the angular increment corresponding to each data set, and $\hat{g}(\omega_s,\omega_z,n/\omega_s)$ is the resolution recovery filter function.

8. The method as set forth in claim 5 wherein the smoothing step includes:

reducing an amplitude of at least one actually collected projection data set adjacent each zero-filled data set.

9. The method as set forth in claim 8 wherein the reduction in amplitude is one-half for each value of the original actually collected projection data set adjacent each zero-filled data set.

10. The method as set forth in claim 8 wherein the actually collected data is disjoint with at least four interfaces between the actually collected and zero-filled data sets.

11. The method as set forth in claim 5 wherein the step of transforming into frequency space includes:

operating with a Fourier transform which is matched to a total of the actually collected and zero-filled data sets.

12. A method of diagnostic imaging comprising:

continuous movement of a gantry which moves a detector head in a continuous angular orbit about a subject in an examination region;

collecting data during the continuous orbit and sorting the data into a plurality of projection data sets corresponding to each of a plurality of angular increments around a subject;

performing a resolution recovery process on the projection data sets; and

reconstructing the resolution recovered projection data sets into an image representation.

13. The method of claim 12 wherein the small angular increments are spaced by less than 7°.

14. The method of claim 12 wherein the angular increments are spaced by 3°.

15. The method of claim 12 wherein the resolution recovery process includes correcting for blurring due to the continuous scanning.

16. The method of claim 15 wherein the resolution recovery process includes:

transforming the data sets into frequency space;

performing a stationary deconvolution on the frequency space data sets with a filter, the filter used in performing the stationary deconvolution being

$$\frac{\sin(n\Delta\phi/2)}{n\Delta\phi/2}\,\hat{g}\left(\omega_s,\omega_z,\frac{n}{\omega_s}\right)$$

where $\Delta\phi$ is the angular increment over which the data is collected in each data set, and $\hat{g}(\omega_s,\omega_z,n/\omega_s)$ is a filter function for projection data collected only at the angular increments; and

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transforming the stationarily deconvolved data sets from frequency space to image space.

17. The method of claim 16 wherein projection data sets with collected projection data span less than 360°, the resolution recovery process function including:

zero-filling projection data sets in the angular rotation direction, the zero-filled and actually collected projection data sets together spanning 360°; and

smoothing each interface between the actually collected and zero-filled data sets, the smoothed data sets being transformed into frequency space.

18. A diagnostic imaging apparatus comprising:

at least one detector head for detecting incident radiation;

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a collimator mounted to the detector head for limiting trajectories along which radiation is receivable by the head;

a movable gantry which moves the detector head around a subject in an examination region;

a data acquisition system which acquires projection data sets from the detector head at angular increments spanning less than 360°;

a zero-filling processor for generating zero-filled data sets between the actually collected projection data sets, to create 360° of data sets;

a smoothing processor for smoothing interfaces between the actually collected and zero-filled data sets;

a resolution recovery processor for operating on the smoothed data sets;

a reconstruction processor which reconstructs the resolution recovered data sets into a three-dimensional image representation; and

an image memory for storing the three-dimensional image representation.

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19. The diagnostic imaging apparatus as set forth in claim 18 wherein the resolution recovery processor includes:

a Fourier transform processor which transforms the smoothed data sets into frequency space; and

a deconvolution processor which deconvolves the frequency space data sets with a resolution recovering deconvolution function, the deconvolved data sets being transformed from frequency space back to image space as the resolution recovered data sets.

20. The diagnostic imaging apparatus as set forth in claim 19 wherein the gantry moves the detector heads in angular steps, each actually collected data set corresponding to one of the angular steps.

21. The diagnostic imaging apparatus as set forth in claim 19 wherein the gantry moves the detector heads continuously and the data acquisition system bins the acquired data into data sets, and the deconvolution processor deconvolves the data sets with:

$$\frac{\sin(n\Delta\phi/2)}{n\Delta\phi/2}\,\hat{g}\left(\omega_s,\omega_z,\frac{n}{\omega_s}\right)$$

where $\Delta\phi$ is the angular increment over which the data is collected in each data set, and $\hat{g}(\omega_s,\omega_z,n/\omega_s)$ is a filter

C1 function for projection data collected only at the angular increments.

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